

REMARKS

Claims 1-3, 6,8-13,15-17,21, 22, 26, 28-32, 35, 37-39, 41, and 45-49 are pending in the application. Claims 1, 26, and 35 are amended herein. Claims 12, 13, 5 15-17, 21, 22, 39, 41, 46, and 48 are canceled without prejudice. No new matter is added by virtue of the amendments herein. Applicant respectfully requests entry of the foregoing amendments and allowance of the application as amended.

Request for Continued Examination

10 This response is accompanied by a Request for Continued Examination under 37 C.F.R. 1.114 and the required fee.

Petition for extension of time

15 A petition for a three (3) month extension of time under 37 C.F.R. § 1.136(a) is included herewith, as well as the fee under 37 C.F.R. § 1.117(a)(3).

Rejections under 35 U.S.C. § 103

Claims 1-3, 6, 8-13, 15-17, 21, 22, 26, 28-30, 32, 35, 37-39 and 41 are rejected under 35 U.S.C. §103(a) as being unpatentable over Silverberg et al, United States 20 (US) Patent Number 5,406,622 (Silverberg), in view of Holzrichter, US Patent Number 5,729,694 (Holzrichter). Claims 12, 13, 15-17, 21, 22, 39, and 41 are canceled without prejudice. Applicant respectfully traverses the rejection.

Applicant respectfully submits that Silverberg discloses an outbound noise cancellation circuit that consists of a transmit microphone and one or more noise-25 collecting reference microphones (column 2, lines 16-19). A first adaptive filter receives the output of a transmit microphone (column 2, lines 26-27). The output of the first adaptive filter is subtractively combined with the output of a reference microphone to provide an enhanced reference signal having little or no speech signal content (column 2, lines 27-33).

A second adaptive filter receives the enhanced reference signal as an input (column 2, lines 34-35). The second adaptive filter produces an output which consists substantially of noise energy only, and the output of the second adaptive filter is a noise cancellation signal (column 2, lines 35-38). The noise cancellation signal is 5 summed with the unprocessed output of the transmit microphone to provide an output signal in which the outbound noise has been removed (column 2, lines 21-25).

Each of the adaptive filters is active or not depending on the presence or absence of speech energy (column 3, lines 10-12). If speech energy is present, the 10 weights of the first adaptive filter are allowed to update, but if speech is absent, the weights of the first adaptive filter are frozen at their last setting (column 3, lines 12-16). Further, if speech energy is absent, the weights of the second adaptive filter are allowed to update, but if speech is present, the weights of the first adaptive filter are frozen at their last setting (column 3, lines 16-20).

The Office Action states, at page 3, that Silverberg does not explicitly teach 15 receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user. Applicant agrees that Silverberg does not teach receiving a voice activity signal that includes information on vibration of human tissue associated with human voicing activity of a user.

Furthermore, Applicant respectfully submits Silverberg does not disclose 20 removing acoustic noise from acoustic signals by applying a first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals (emphasis added). The Office Action states, at page 3, that the first and second adaptive filters described in Silverberg are analogous to the first and second transfer functions of the present 25 invention. Assuming, arguendo, this analogy is correct to apply, Silverberg describes a circuit that receives an input signal from a microphone, processes the signal with a first adaptive filter (first transfer function) to produce an enhanced reference signal, and then subsequently processes the enhanced reference signal with a second adaptive filter (second transfer function) to produce a noise cancellation signal that is applied to the 30 microphone signal to produce an output signal in which noise has been removed, as

described above. Therefore, Applicant submits Silverberg is processing the input signal by applying a first transfer function and then applying a second transfer function.

As such, the circuit of Silverberg in which a first transfer function is applied to 5 a signal followed by the application of a second transfer function stands in stark contrast to claim 1 as amended herein (emphasis added). Amended claim 1 claims removing acoustic noise from acoustic signals by applying a first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals (emphasis added). The 10 application of a first transfer signal followed by application of a second transfer function (Silverberg) is different from and does not make unpatentable the application of a first transfer function and at least one combination of the first transfer function and the second transfer function, as claimed in amended claim 1.

While Silverberg fails to teach application of a first transfer function and at 15 least one combination of the first transfer function and the second transfer function, Applicant also fails to find any teaching in Holzrichter of the application of a first transfer function and at least one combination of the first transfer function and the second transfer function. Instead of a transfer function, Holzrichter generates a Fourier Transform, which is a measure of the frequency content of a signal. In order to 20 generate a transfer function, two signals (an input and output) are needed. Holzrichter teaches the use of a single signal and simply transforms the single signal into the frequency domain, which is completely different from, and exclusive of, taking two signals and generating a transfer function.

Therefore, Holzrichter, like Silverberg, does not disclose removing acoustic 25 noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals and, as such, does not overcome the deficiencies of Silverberg in making claim 1 unpatentable. Consequently, the combination of Silverberg in view of Holzrichter fails to disclose 30 removing acoustic noise from at least one of the acoustic signals by applying the first

transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. For at least these reasons, Applicant respectfully submits that amended claim 1 is patentable over Silverberg in view of Holzrichter.

5 As claims 2, 3, 6, 8-11, 45, and 47 depend from amended claim 1 and include further limitations thereon, and since amended claim 1 is patentable over Silverberg in view of Holzrichter, Applicant submits that claims 2, 3, 6, 8-11, 45, and 47 are patentable over Silverberg in view of Holzrichter.

10 Applicant submits that claim 26 is patentable over Silverberg in view of Holzrichter for the reasons stated above with reference to claim 1. As claims 28-32 and 49 depend from amended claim 26 and include further limitations thereon, and since amended claim 26 is patentable over Silverberg in view of Holzrichter, Applicant submits that claims 28-32 and 49 are patentable over Silverberg in view of Holzrichter.

15 Applicant submits that claim 35 is patentable over Silverberg in view of Holzrichter for the reasons stated above with reference to claim 1. As claims 37 and 38 depend from amended claim 35 and include further limitations thereon, and since amended claim 35 is patentable over Silverberg in view of Holzrichter, Applicant submits that claims 37 and 38 are patentable over Silverberg in view of Holzrichter.

20 Claims 31, 45 and 46 are rejected under 35 U.S.C. §103(a) as being unpatentable over Silverberg as modified by Holzrichter, and further in view of Cezanne et al., US Patent Number 5,473,701 (Cezanne). Claim 46 is canceled herein without prejudice. As described in detail above, the combination of Holzrichter and Silverberg does not disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. Applicant also fails to find any teaching in Cezanne of the application of a first transfer function and at least one combination of the first transfer function and the second transfer function. Consequently, the combination of 25 Silverberg, Holzrichter, and Cezanne fails to disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one 30

combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. For at least this reason, Applicant respectfully submits that claims 31 and 45 are patentable over Silverberg in view of Holzrichter and Cezanne.

5 Claims 47-49 are rejected under 35 U.S.C. §103(a) as being unpatentable over Silverberg as modified by Holzrichter, and further in view of Bradley et al., US Patent Number 5,463,694 (Bradley). Claim 48 is canceled herein without prejudice. As described in detail above, the combination of Holzrichter and Silverberg does not disclose removing acoustic noise from at least one of the acoustic signals by applying
10 the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. Applicant also fails to find any teaching in Bradley of the application of a first transfer function and at least one combination of the first transfer function and the second transfer function. Consequently, the combination of Silverberg, Holzrichter,
15 and Bradley fails to disclose removing acoustic noise from at least one of the acoustic signals by applying the first transfer function and at least one combination of the first transfer function and the second transfer function to the acoustic signals and generating denoised acoustic signals. For at least this reason, Applicant respectfully submits that claims 47 and 49 are patentable over Silverberg in view of Holzrichter and Bradley.

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Conclusion

25 In view of the foregoing amendments and Remarks, Applicant respectfully submits that all objections and rejections have been overcome, and the claims are now allowable. Prompt allowance of the application is earnestly solicited. Examiner Lao is respectfully requested telephone the undersigned to facilitate resolution of any issues prior to allowance of the application.

Authorization to Charge Deposit Account

If there are any fees due and unpaid in this application, please charge Deposit Account No. 503616 for these fees (Attorney Docket No. ALPH.P010X).

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Respectfully submitted,
Courtney Staniford & Gregory LLP



Richard L. Gregory, Jr., Reg. No. 42,607

Tel: 408-342-1900

Fax: 408-342-1909

Email: rgregory@csgip.com

Courtney Staniford & Gregory LLP
10001 N. De Anza Blvd. STE 300
Cupertino, CA 95014